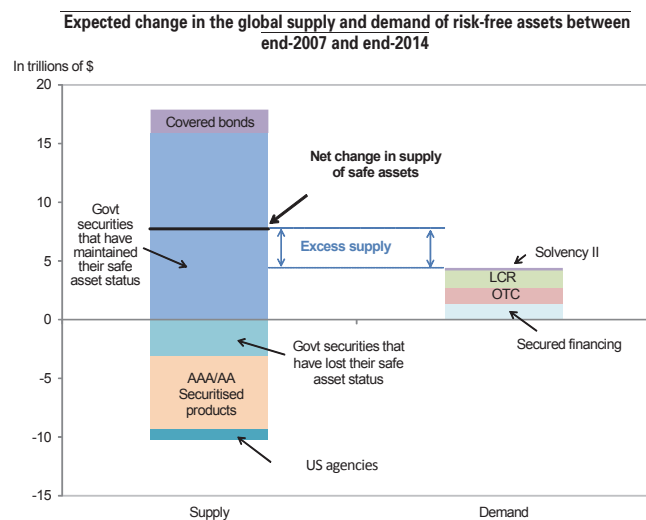


## Are safe assets to become scarcer?

- Safe assets, i.e. highly liquid assets with a very low default risk, play a key role in the global financial system. They can, for example, offer a safe haven to investors or be used as collateral in transactions between financial entities.
- With some of these assets losing their risk-free status in the wake of the recent financial crisis, and with demand for safe assets expected to exhibit structural growth, particularly as a result of prudential reforms, some analysts are worried that risk-free assets may become increasingly scarce.
- Despite these developments, the relative increase in the supply and demand of safe assets, which began in 2007 and is set to continue up to 2014, indicates that there is little danger of this asset class becoming scarce on a global scale.
- During the same period, the global supply of safe assets is likely to grow substantially on the back of an increase in government bond issues in OECD countries and despite the disappearance of certain large-sized bonds from this asset class along with some securitised products that previously enjoyed a strong credit rating.
- That said, these global developments mask the strong disparities between monetary areas. More specifically, while the situation in the US does not appear to be giving cause for concern, the euro area seems to be more problematic. Nevertheless, the danger that these safe assets might become increasingly rare within the euro area has dissipated considerably following institutional reforms in Europe and the launch of the ECB's Outright Monetary Transactions (OMT) programme.

This study was prepared under the authority of the Directorate General of the Treasury (DG Trésor) and does not necessarily reflect the position of the Ministry of Economy and Finance and Ministry of Foreign Trade



Source: DG Trésor estimates.

To assess whether or not a shortage or scarcity<sup>1</sup> of these assets is a possibility, we look at the expected changes in the supply and demand of these assets between end-2007 and end-2014. This period begins just before the 2008 financial crisis when there was still a healthy supply of assets perceived as safe and which had not

yet been affected by the rise in the level of risk associated with certain securities, and culminates at end-2014, when the majority of prudential reforms designed to boost demand for risk-free assets will have come into effect.

## 1. The global supply of safe assets is set to rise between end-2007 and end-2014

### 1.1 It is difficult to define a risk-free asset

In theory, a risk-free asset is a financial security that provides the same rate of return, regardless of the state of the world (as per the Arrow-Debreu model). In practice, this type of asset does not exist, but some securities fit this definition relatively closely. According to the IMF (2012)<sup>2</sup>, safe assets meet the criteria of: (i.) low credit and market risks; (ii.) high market liquidity; (iii.) limited inflation risks, and (iv.) low exchange rate risk.

Dang, Gorton and Holmstrom (2010)<sup>3</sup> and Holmstrom (2008)<sup>4</sup> believe that **riskless assets are information insensitive**. The advantage of a riskless asset, used for example as collateral in a financial transaction, is that it can be priced without investors having to incur additional costs to obtain information about the quality of the issuer. The assets are deemed safe by all investors and no extra information is therefore required. They are assets that enable market players to easily coordinate their actions. This nevertheless implies that they are used on the basis of "perceived safety" rather than on a true understanding of their underlying fundamentals.

According to Gourinchas and Jeanne (2012)<sup>5</sup>, only public debt instruments constitute true risk-free assets as long as the central bank is prepared to intervene and act as a lender of last resort to the sovereign debt issuer if there is a liquidity crisis.

On the markets, an asset is considered to be risk-free on the basis of the credit rating it obtains from the principal ratings agencies. These ratings are an affordable benchmark for investors looking to assess the quality of an asset. The 2008 crisis nevertheless showed that this means of assessing an asset's safety was imperfect as the agencies significantly under-estimated the risk posed by certain types of securities.

The IMF (2012) estimated risk-free assets at some 73 trillion US dollars<sup>6</sup> as at the end of 2011, comprising mainly sovereign bonds: sovereign bonds with AAA and AA credit ratings from two major agencies accounted for 44% of risk-free assets (32 trillion US dollars), and sovereign bonds with A and BBB ratings accounted for 7%. Securitised products were the second-biggest group (17%). Gold and investment grade corporate bonds accounted for 11%, and covered bonds 5%.

### 1.2 A sharp increase of around 8 trillion US dollars is expected in the supply of risk-free assets between end-2007 and end-2014, mainly from new sovereign debt issues by countries whose government securities have maintained their safe haven status

1.2.1 The net supply of high-quality government securities has increased since the start of the crisis despite the deterioration in several sovereign credit ratings

Sovereign bonds with an AAA/AA rating accounted for most of the risk-free supply, totalling close to 32 trillion US dollars at end-2011. The stock of tradable sovereign bonds with a triple-A rating from at least two ratings agencies stood at 23 trillion US dollars: the main issuers were the US, whose sovereign debt accounted for 65% of triple-A rated sovereign bonds, Germany (11%), the UK (9%) and Canada (6%). The stock of sovereign bonds issued by the developed economies with a AA rating was close to 9 trillion US dollars. Japanese debt, held mainly by its residents, accounted for 80% of this stock and French debt for 14%.

This stock of high-quality sovereign debt (AAA/AA rating) has grown since 2007 as a result of the increase in the budget deficits of the world's most developed economies, mainly the US, and despite the downgrades to sovereign debt ratings in several European countries. Six European countries<sup>7</sup> saw their sovereign debt downgraded from the highest rating (AAA and AA by Fitch and S&P) to average (A and BBB) following the appearance of tension on the sovereign debt market in 2009. They were Iceland, Ireland, Italy, Portugal, Slovenia and Spain<sup>8</sup>. Together, their debt totalled 3.1 trillion US dollars in 2007 when the first downgrades occurred.

Nevertheless, these downgrades were more than offset by the rise in the borrowing requirements of some 15 developed nations that still boasted a AAA or AA<sup>9</sup> rating, climbing to 15.9 trillion US dollars during the period 2007-2014 (see Chart 1 for the breakdown by geographic area of this increase in supply). As a result, the impact of these sovereign downgrades and the growing borrowing requirements of sovereign issuers with AAA/AA ratings on the supply of risk-free assets was and should continue to be positive to the tune of some 12.8 trillion US dollars during the period end 2007/end 2014.

Furthermore, classed as US government-backed assets, the outstanding debt of US government agencies (including Fannie Mae, Freddie Mac, FHLB, Farm Credit, etc.) amounted to close to 2.5 trillion US dollars at end-2012. Outstanding debt issued by US government agencies has contracted by 620 billion

(1) A shortage corresponds to a situation whereby investors looking for safe assets would be unable to find them on the market, while scarcity implies that they are rarer and consequently more expensive.

(2) IMF, "Global Financial Stability Report: The Quest for Lasting Stability", April 2012.

(3) T. V Dang, G. Gorton, B. Holmstrom, (2011), "Repo, haircuts and liquidity", *NBER*.

(4) Holmstrom, Bengt, "The Panic of 2007", Jackson Hole Conference.

(5) P-O Gourinchas, O. Jeanne (2012), "Global safe assets", *BIS working paper*.

(6) 10 to the power of 12.

(7) Greece's sovereign debt was also downgraded from investment grade category to junk status during the same period.

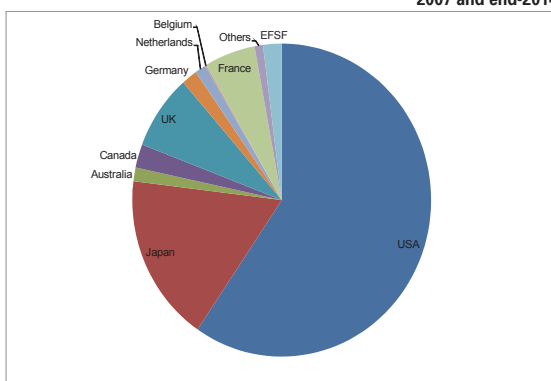
(8) When the ratings allocated by the three main ratings agencies (Fitch, Moody's and S&P) are not fully in line, the rating retained is based on the minimum awarded by two of the three agencies.

(9) Includes the borrowing requirements for countries rated AAA or AA, the 250 billion US dollars of bonds issued by the European Financial Stability Facility and the European Stability Mechanism.

US dollars since end-2007. If we assume that this figure will remain constant until end-2014, the supply of safe assets issued by banks is set to fall by some 620 billion US dollars as a result of the change in debt issued by these US agencies between end-2007 and end-2014.

**Overall, the supply of "high-quality" public securities (issued by governments and agencies) is likely to grow by close to 12.2 trillion US dollars between end-2007 and end-2014.**

Chart 1: geographic breakdown of rise in sovereign bonds between end-2007 and end-2014



Source: IMF, DG Trésor.

**1.2.2 The stock of outstanding securitised products with strong credit ratings has declined considerably since 2008**

According to the IMF, securitised products accounted for 17% of the supply of risk-free assets, with total outstandings of almost 12 trillion US dollars at end-2011, the majority of which comprised US (80%), UK (6%), Dutch (3.5%) and Spanish (3%) collateral.

**Total outstandings of securitised assets has been more or less flat since 2008<sup>10</sup> despite the downturn in US private-sector securitised assets.** While outstanding US private-sector securitised assets grew from just under 5 trillion US dollars in 2006 to 500 billion US dollars in 2011<sup>11</sup>, most private debt issuers were replaced by US government agencies: in 2012, over 85% of US securitised products were issued by government agencies.

**Nevertheless, the stock of risk-free securitised products has diminished considerably as a result of the massive**

**downgrades in the products that had enjoyed strong credit ratings before the 2008 financial crisis.** While 90% of European securitised products and 86% of similar US products were ranked AAA or AA by Moody's at end-2007, these numbers fell to 55% and 34% end-2012 respectively. Overall, outstanding US and European securitised products with a AAA or AA rating fell from 9.5 trillion US dollars at end-2007 to 4.2 trillion US dollars end-2012. If we assume this amount will see a continual decline in 2013 and 2014, **over 6.2 trillion US dollars in securitised products are likely to disappear from the global stock of safe assets between end-2007 and end-2014.**

**1.2.3 Although it is difficult to evaluate the change in the stock of investment grade corporate debt, outstanding covered bonds are set to increase between end-2007 and end-2014**

According to the IMF, investment grade corporate bonds<sup>12</sup> accounted for 11% of the supply of risk-free assets in 2011 (outstandings of 8.2 trillion US dollars). According to Standard and Poor's data, gross investment grade corporate bond issues on a global scale slipped from 1.9 trillion US dollars in 2007 to 1.7 trillion US dollars in 2012 (-10%), mainly as a result of the contraction in debt issued in the US and Europe (-31% and -9% respectively) and despite the jump in issues in emerging economies which doubled during the same period from 68 billion US dollars to 135 billion US dollars. Due to the lack of data about the corporate debt stock, we are maintaining our assumption that it will be constant between 2007 and 2014.

**Lastly, outstanding covered bonds grew by 17% between 2007 and 2011 (i.e. by close to 1 trillion US dollars<sup>13</sup>).** Covered bond issues soared by 50% during that period from 640 billion US dollars in 2007 to 970 billion US dollars in 2011, not only in market economies that were not affected by the sovereign debt crisis (e.g. Canada, Scandinavia), but also in European countries: covered bonds backed by tangible assets offer investors a greater chance of a return on their investment than unbacked assets, which is highly appealing in volatile markets. **If we assume that the average annual rate of growth seen in covered bonds between 2007 and 2011 will continue in 2011-2014, we estimate that the supply of covered bonds is set to grow by close to 2 trillion US dollars during that period.**

**Overall, and based on our estimate, which is subject to many unknown factors, the total supply of safe assets is expected to increase by 8 trillion US dollars between end-2007 and end-2014.**

Table 1: change in total supply of safe assets

Sources of a change in supply	Change 2007-2014
Change in stock of government securities that kept their safe haven status	+\$15.9 trillion
Stock of government securities in 2007 that lost their safe haven status	-\$3.1 trillion
Fall in outstandings held by US government agencies	-\$0.6 trillion
Fall in outstanding securitised products rated AAA or AA	-\$6.2 trillion
Change in supply of covered bonds	+\$2 trillion
Change in stock of safe corporate bonds	Constant
<b>Total</b>	<b>\$8 trillion</b>

Source: DG Trésor estimates.

## 2. Excepted global demand for safe assets is set to grow between end-2007 and end-2014

**In the short run, the demand for risk-free assets is first and foremost determined by the portfolio choices made by investors who are constantly making arbitrage decisions between risk and reward.** Although the ramp-up in risk

aversion following the US financial crisis and the euro area crisis certainly led to a substantial increase in the demand for risk-free assets, triggering in turn a significant dip in the yields of sovereign bonds that had maintained their safe haven status, **it is difficult**

(10) According to the Association For Financial Markets in Europe (AFME), outstanding securitised products on US markets contracted from 9 trillion US dollars end-2007 to 8.8 trillion US dollars mid-2012 while they increased on European markets from 1.7 trillion US dollars to 2.3 trillion US dollars.

(11) See Claessens, Pozsar, Ratnovski, and Singh (2012), "Shadow Banking: Economics and Policy", IMF.

(12) Corporate bonds with an investment grade rating are rated between AAA and BBB.

(13) Source: European Covered Bond Council.

to estimate the part played by cyclical factors in the demand for risk-free assets. In the medium term (by end-2014), the demand for risk-free assets is likely to increase as a result of clearly identified structural developments, including the transformation of the financial markets (i.e. an increase in secured financing operations at the expense of unsecured operations) and the introduction of new prudential rules (Basel III liquidity ratios, new regulations for OTC derivatives, and stricter prudential rules for the insurance sector)<sup>14</sup>.

## 2.1 The growing popularity of secured financing operations at the expense of unsecured operations is boosting demand for risk-free assets

Secured financing operations based on repurchase agreements (repo) have expanded considerably since the mid-1990s.<sup>15</sup> In Europe for example, the repo market tripled between 2001 and 2011 from 924 billion euros to 3.1 trillion euros.<sup>16</sup> The popularity enjoyed by this type of operation among financial institutions can be attributed to the safety that it offers, particularly for the lender who benefits from collateral that limits the counterparty risk to which s/he is exposed. The creation of the tripartite market,<sup>17</sup> the availability of collateral before the crisis and the favourable treatment of these operations in the Basel regulatory framework (compared to unsecured operations) also explains why they appeal to investors.

Although the repo markets experienced some difficulties after the 2008 crisis, particularly in the US,<sup>18</sup> their growth has picked up since then and is likely to continue in the next few years. In the US, the repo market contracted from a peak of 3.5 trillion US dollars in April 2007 to only 2 trillion US dollars in April 2009 before climbing back up to 2.5 trillion US dollars in 2012.<sup>19</sup> The European repo market accounted for 3.8 trillion US dollars (2.9 trillion euros) at end-2012, i.e. much lower than the peaks reached between 2007 and 2009 (around 3.5 trillion euros). Lastly, the Japanese repo market evolved in a similar direction to the US and European markets, seeing almost continuous growth between 2001 and 2008, from less than 1 trillion US dollars to over 4 trillion US dollars, followed by a significant reduction post-crisis to reach 2.5 trillion US dollars mid-2010 before picking up again to around 3 trillion US dollars at beginning-2013.<sup>20</sup>

To estimate the growth in US, European and Japanese repo markets between now and 2014, we have assumed an annual growth rate for the period 2012-2014 of 10% as per the Levels and Capel (2012)<sup>21</sup> article. Consequently, we estimate that the European repo market is likely to grow by between 1.2 trillion US dollars between end-2007 and end-2014 while the US market, which has shrunk by more since the 2008 crisis, is likely to add only some 220 billion US dollars compared to end-2007. The Japanese market is not expected to see any change during the period. In total, this will require an additional 1.4 trillion US dollars in safe assets between end-2007 and end-2014.

## 2.2 The coming into force of the LCR liquidity ratio is likely to significantly boost demand for safe assets

Between now and 2018, the banks will be required to comply with two new liquidity ratios as part of the new standards set by the Basel Committee, including the Liquidity Coverage Ratio (LCR)<sup>22</sup> designed to cover potential liquidity outflows over a one-month period if a major liquidity shock occurs. The introduction of this ratio is expected to boost the demand for safe assets as it will force banks to hold assets that are immediately liquid and that can be sold instantly on the market with a limited risk of losing capital.

It was initially planned that this new rule would come into effect on 1 January 2015.<sup>23</sup> In January 2013, however, the Basel Committee on Banking Supervision extended this deadline and made significant changes to the eligibility criteria regarding assets that could be included in the numerator when calculating the ratio. For example, the banks will be able to include certain equities or corporate bonds rated as low as BBB- to comply with these ratios. Furthermore, the deadline for introducing this ratio has been pushed back to 1 January 2018 compared to the previous deadline of end-2014. The banks will nevertheless have to comply with 60% of the ratio by 1 January 2015 and then gradually increase this over the following four years to become fully compliant by 1 January 2018.

(14) In the longer term, the demand for safe assets will also depend on demographic factors, particularly the ageing global population. Moreover, the rebalancing of global savings, which is likely to put downward pressure on the demand from emerging economies for government securities issued by the developed economies, and the growth of the financial markets in the emerging economies, should make it possible to create new safe assets that should in turn help to alleviate some of the pressure on the supply of safe assets.

(15) See "Securities Lending and Repos: Market Overview and Financial Stability Issues" (2012), Financial Stability Board, for a detailed description of the repo market.

(16) Data from the International Capital Market Association.

(17) The repo operations carried out on the tripartite market require the involvement of a clearing bank between the borrower and the lender. The bank manages the collateral, records the transactions and manages their settlement. Compared to bilateral trades, tripartite trades are therefore cheaper for the borrower and the lender as they outsource the back office work related with these transactions. In the US, JP Morgan and the Bank of New York Mellon are the only two clearing banks involved in this activity.

(18) See Adrian, Begalle, Copeland and Martin (2011), "Repo and Securities", Federal Reserve Bank of New York.

(19) Only the New York Fed's data on the tripartite repo market is available. It totalled around 2 trillion US dollars in December 2012. According to the FSB (2012), this market segment accounted for 65-80% of the total market, hence between 2.4 trillion US dollars and 2.7 trillion US dollars. To estimate the total size of the US repo market, we have assumed that the tripartite repo market represents some 70% of the tripartite market.

(20) Data from the Japan Securities Dealer Association.

(21) Levels and Capels (2012) extrapolate the change in the repo markets for the period 2012-2014 from an estimate for the market trend during 2001-2011. In so doing, they obtain an annual growth figure for 2012-2013 of 10%. See "Is collateral becoming scarce? Evidence for the euro area", Journal of Financial Market Infrastructure.

(22) The LCR forces the banks to hold first-rate, highly liquid assets that are sufficient to cover its liquidity requirements based on a stress-test scenario of 30 days.

(23) There are two types of securities eligible for inclusion in the numerator: (i.) cash, compulsory reserves held with the central bank, sovereign bonds or bonds from multilateral institutions weighted at 0% in Basel's prudential regulations not subject to a haircut; and (ii.) sovereign assets, sub-sovereign assets and assets from multilateral institutions weighted at 20% in Basel's prudential regulations, covered bonds rated at least AA- and non-financial private sector bonds rated at least AA-, all subject to a haircut of 15%.

Before these changes were introduced, the increase in demand for safe assets triggered by these new supervisory rules was estimated at between 1.9 trillion US dollars (McKinsey, 2010)<sup>24</sup> and 2.2 trillion US dollars (Basel Committee, 2012).<sup>25</sup> By 2014, and since only 60% of the new ratios must be complied with, we estimate that the banks will need an additional 1.3 trillion US dollars in liquid assets (60% of 2.2 trillion US dollars).<sup>26</sup>

### 2.3 Regulation of the over-the-counter (OTC) derivatives markets through the initial margin requirement is likely to boost the demand for risk-free assets, but in proportions that are difficult to estimate

The financial crisis drew attention to the importance of the counterparty risk associated with OTC derivative contracts. Growth in the OTC derivatives markets was almost exponential between 1998 and 2007, with the nominal value soaring from 94 trillion US dollars in December 2000 to 648 trillion US dollars in 2007. More than 80% of these derivative products were interest-rate swaps.

To reduce the systemic risk and boost this market's transparency, the members of the G20 made a commitment in 2009 at the Pittsburgh Summit to ensure that derivatives be cleared by a Central Counterparty Clearing House (CCP). Furthermore, in 2011 the Basel Committee and the IOSCO were tasked with designing international standards for the initial margin requirement on non-centrally cleared derivatives (OTC derivatives). These new regulations (providing for centrally-cleared derivatives and initial margin requirement on OTC derivatives) will result in greater demand for safe assets that can be used as collateral.<sup>27</sup>

The studies performed to assess the impact these new measures will have on additional demand for collateral have resulted in estimates varying between 100 billion US dollars and 2,500 billion US dollars (see table 2). The very wide range of estimates obtained reflects the difficulty of the exercise. First, these new rules have still not been firmly established (particularly for OTC derivatives). Second, there is significant uncertainty regarding how the market will adapt to these new regulations, particularly surrounding the proportion of OTC derivatives that will be centrally-cleared,<sup>28</sup> the degree of "netting" that the major operators will be able to carry out,<sup>29</sup> the possibilities of rehypothecation of existing collateral (see Box 1) and the size of the initial margins charged (which depend on market conditions).

### 2.4 The introduction of the Solvency II Directive is likely to boost demand for risk-free assets but only to a limited extent

The application of the Solvency II Directive in the insurance sector<sup>30</sup> will increase the demand for safe assets in that the new rules mean that the capital charges depend on the quality of the portfolio's credit rating, which encourages investors to switch to safe assets that consume less net equity and turn away from assets that consume more. As far as we know, there is no precise estimate as to how much demand for safe assets will increase following the introduction of Solvency II, but according to professionals in the insurance sector, the increase may be relatively limited and is not expected to exceed 200 billion US dollars.<sup>31</sup>

In total, we estimate the rise in demand for safe assets at 4.4 trillion US dollars between end-2007 and end-2014.

Table 2: estimated increase in demand for collateral due to OTC derivatives market regulations

Study	Fields covered	Products	Additional collateral requirement
IMF (2012)	Centrally-cleared derivatives and OTC derivatives	All derivatives	\$100-200bn
JP Morgan (2012)	Centrally-cleared derivatives and OTC derivatives	All derivatives	\$350-1,000bn
Singh (2010)	Centrally-cleared derivatives	All derivatives	\$1,200bn
BoE (2012)	Centrally-cleared derivatives and OTC derivatives	Interest-rate swaps and CDS	\$130-450bn
OCC (2011)	OTC derivatives	Interest-rate swaps (US)	\$2,000-2,500bn
Levels et Capel (2012)	Centrally-cleared derivatives and OTC derivatives	All derivatives	\$1,560bn
BIS (2012)	Centrally-cleared derivatives	Interest-rate swaps and CDS	\$718bn
Morgan Stanley (2012)	Centrally-cleared derivatives	Interest-rate swaps and CDS	\$180-1,400bn

Sources : FMI, JP Morgan, Bank of England, OCC, BIS, Morgan Stanley.

Table 3: évolution de la demande totale pour les actifs sûrs

Sources of change in demand	Assumed change 2007-2014
Increase in covered bonds	+\$1.4 trillion
Liquidity Coverage Ratio	+\$1.3 trillion
OTC <sup>a</sup> derivatives	+\$1.5 trillion
Solvency II	+\$0.2 trillion
<b>Total</b>	<b>\$4.4 trillion</b>

a. Based on the very wide range of estimates of the requirements for risk-free assets that will come as a result of the change to OTC derivatives markets regulations, we have opted for a relatively conservative figure of 1.5 trillion US dollars, at the high end of the estimate range.

Source: DG Trésor estimates.

(24) McKinsey, "Basel III and European Banking: Its impact, how banks might respond, and the challenges of implementation", November 2010.

(25) Basel Committee on Banking Supervision, "Results of the Basel III monitoring exercise as of 31 December 2011".

(26) These requirements are not evenly split between US and European banks since two-thirds of the requirements for additional liquid assets can be traced to European banks (according to McKinsey, European banks are set to increase the safe assets they hold by 1.3 trillion US dollars compared to only 0.6 trillion US dollars for US banks).

(27) In particular, centrally-cleared transactions require a security deposit (cash or risk-free securities), daily margin calls (generally in the form of cash) and contribution to a security fund to protect against the risk of insolvency in the form of cash or risk-free securities.

(28) Most estimates assume 80% of transactions will be centrally-cleared.

(29) When a dealer holds short and long positions on the same contract, s/he can "net" these positions and reduce the initial margin to be paid to the clearing house. With only gross data available on OTC derivatives (short and long), an estimate of dealers' total netting is required.

(30) Solvency II is due to come into effect in 2015/16.

(31) "Are there enough liquid assets to satisfy regulation", risk.net, November 2010.

### 3. The increase in the global supply of risk-free assets is likely to outstrip demand, while at the same time, there is a danger of safe assets becoming scarce in the euro area

#### 3.1 The increase in the global supply of risk-free assets is likely to outstrip demand

In total, between end-2007 and end-2014, we estimate that the global supply of risk-free assets is set to increase by some 8 trillion US dollars, mainly as a result of the increase in government securities issued by OECD countries despite the disappearance of certain large-sized sovereign bonds (notably Italy and Spain) or of high-quality securitised products. At the same time, the demand for safe assets is likely to increase during the same period by around 4.4 trillion US dollars.<sup>32</sup>

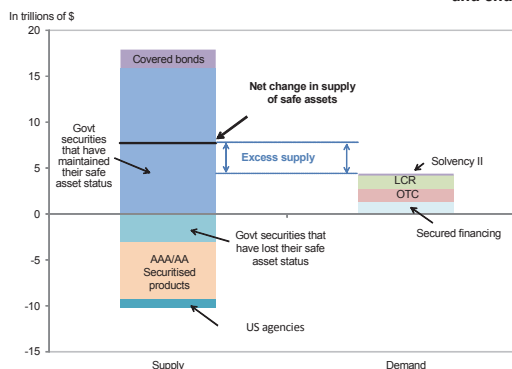
Several factors could nevertheless have an impact on this estimate:

- Since the crisis, there has been **less re-use of high-quality collateral** on the financial markets (see Box 1) which could limit the availability of safe assets. Recent estimates<sup>33</sup> point towards a possible reduction in the supply of safe assets to the tune of between 1.5 trillion US dollars and 2.8 trillion US dollars.
- If there is **renewed finance market turbulence**, the demand for collateral could quickly increase, including the demand related to the new regulations for derivatives. The rise in the initial margins on OTC transactions or in the security deposits required by the clearing houses as a result of

these new regulations could have a pro-cyclical effect on the demand for safe assets.

- In contrast, pressure on the supply of safe assets may be partially reduced through the creation of **new financial activities aimed at optimising the use of collateral** and more generally through improved management of collateral by financial institutions.<sup>34</sup>

Chart 2: change in supply and demand of safe assets between end-2007 and end-2014



Source: DG Trésor.

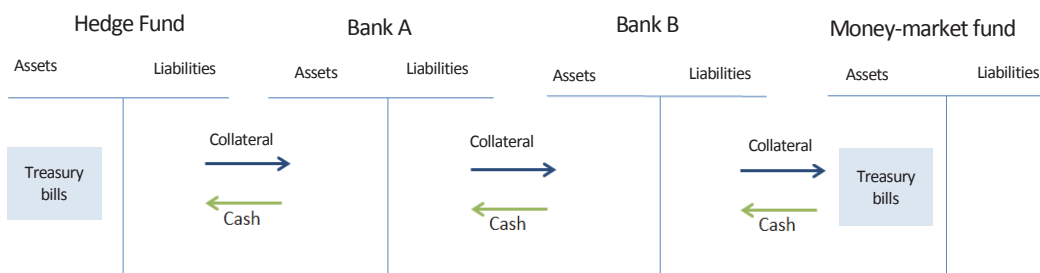
#### Box 1: The velocity of collateral has declined since 2007

The re-use of collateral, is a key element in the functioning of the finance markets (Singh, 2011 and 2012).<sup>a</sup> A rehypothecation chain implies that the institutions holding a large portion of their assets as safe assets (hedge funds, pension funds, insurance companies and asset management funds) seek to optimise their return on these low-yield assets by lending them to the major international banks (brokers-dealers) in exchange for liquidity.<sup>b</sup> These broker-dealers (Bank A below) then re-use the collateral received in the first transaction to perform other financing operations, with other banks for example (Bank B below), that can in turn re-use the collateral to obtain credit from money-market funds. Consequently, the same piece of collateral can be used in several operations carried out simultaneously.

By looking at the balance sheets of the main international banks and estimating the initial supply of collateral, Singh (2011) shows that during the period from end-2007 to end-2010, the amount of high-quality collateral available diminished (adjustments to the risk associated with certain assets deemed as safe pre-crisis) as did the velocity of the collateral (fall in the number of times the collateral was re-used). Singh estimates that the re-use of collateral fell by around 20% between 2007 and 2011.

The new prudential rules, particularly those relating to the OTC derivatives markets, are likely to reduce the possibilities for re-using collateral.

Chart 3: example of a rehypothecation chain



Source: IMF (2012).

- a. Singh, Manmohan, (2011), "Velocity of Pledged Collateral-Analysis and Implication" and, 2012, "The (Other) Deleveraging".  
 b. Ownership of this security is optimised since its yield (e.g. sovereign bond coupon) is complemented by an additional return gained from lending the security to a third party.

(32) Only the structural portion of safe assets has been evaluated here. The portion affected by the economic climate, related in particular to risk aversion, may vary considerably depending on the period studied.

(33) See appendix of the presentation of the Q2-2013 report, US Treasury Office of Debt Management.

(34) BIS (2013), "Asset encumbrance, financial reform and the demand for collateral assets".

### 3.2 Risk-free assets may become scarcer in the euro area if the bonds of those sovereign debt issuers currently experiencing difficulties due to market conditions do not regain safe haven status

Over and above the global change in the supply and demand safe assets, it is worth taking a closer look at these changes based on monetary area, since the safe assets used by financial institutions either to meet regulatory requirements or carry out financial operations are mainly denominated in their own currency.<sup>35</sup> Consequently, local supply and demand conditions for safe assets within each monetary area also seem to be key in ensuring that the financial markets remain liquid.

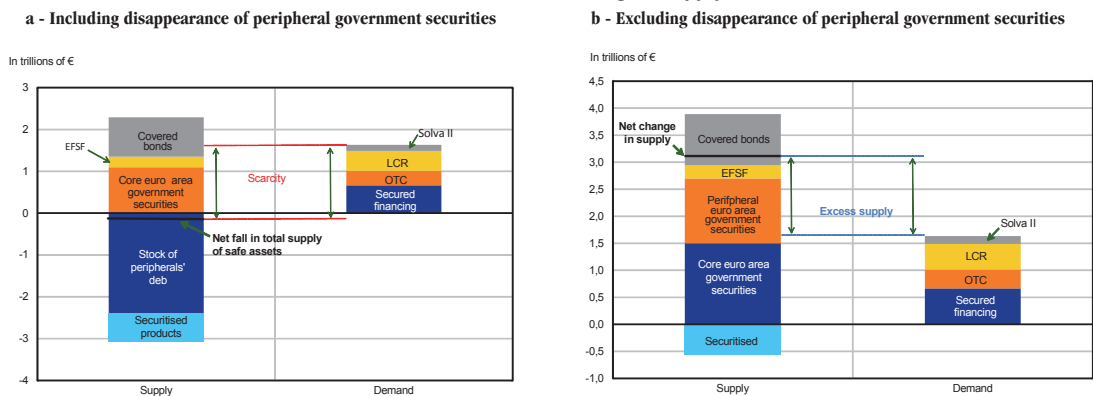
Based on our estimates, and given that government securities issued by the peripheral countries have been stripped of their risk-free status, risk-free assets in the euro area may become scarcer. The supply of risk-free assets in the euro area is expected to move in two opposite directions between 2007 and 2014: 1) upwards thanks to new debt issued by core euro area economies that still enjoy risk-free status (+1.1 trillion euros) and by the European Financial Stability Facility (+250 billion euros), as well as growth on the covered bonds market (+940 billion euros); and 2) downwards as a result of the disappearance of government securities by those countries most affected by the crisis (-2.4 trillion euros) and European securitised products that previously boasted a AAA/AA credit rating (-571 billion euros). At the same time, demand for safe assets in the euro area could rise as a result of the increase in secured finance

transactions (+665 billion euros),<sup>36</sup> derivatives market regulations (+350 billion euros),<sup>37</sup> the implementation of LCR ratios (+475 billion euros) and the introduction of Solvency II (+144 billion euros).<sup>38</sup>

In total, between 2007 and 2014, the supply of risk-free assets is set to fall by less than 100 billion euros, while demand for these assets is expected to rise by a little over 1.6 trillion euros (see Chart 4a). The euro area could therefore suffer from a scarcity of safe assets, mainly due to the fact that a portion of its government securities is no longer seen as risk-free by the markets. In the other major developed economies, significant issues of government securities and intervention by the central banks have made it possible to replace certain private securities that had lost their risk-free status with government securities deemed safe by the markets.

Nevertheless, by 2014, if euro area sovereign bonds currently perceived as risky were to regain their risk-free status, the demand for safe assets by European financial institutions would be more than met (see Chart 4b). Since the ECB announced its Outright Monetary Transactions (OMT)<sup>39</sup> programme, and on the back of progress made regarding the creation of a European banking union, the sharp decrease in sovereign bond yields in those countries that had previously been put under pressure by the markets suggests that the latter are on the road back to recovering their risk-free status.

Chart 4: change in supply and demand of euro area assets, 2007-2014



Source: DG Trésor estimates.

(35) Most of the analyses regarding the possible scarcity of safe assets focus on the changes to global supply and demand (IMF (2012), BIS (2013) or Morgan Stanley (2013)). Only Levels and Capel (2012) and ESMA (2013) base their estimates on the change to supply and demand in the euro area alone.

(36) We assume that the euro area repo market accounts for 72% of the European market in keeping with the percentages used by Levels and Capels (2012).

(37) Similarly, having only one global estimate for the rise in demand for collateral as a result of the new OTC market regulations, we used the same estimated percentages as Levels and Capels (2012) to calculate the portion of demand by euro area financial institutions which represent 31% of the global OTC market.

(38) We have also used the 72% percentage here.

(39) Through the OMT programme, the ECB said that it was ready to make unlimited purchases of sovereign bonds (maturing in less than three years) issued by countries experiencing difficulties on condition that the latter asked for financial assistance from the European Stability Mechanism.

## Box 2: How does central bank action influence the supply and demand of risk-free assets?

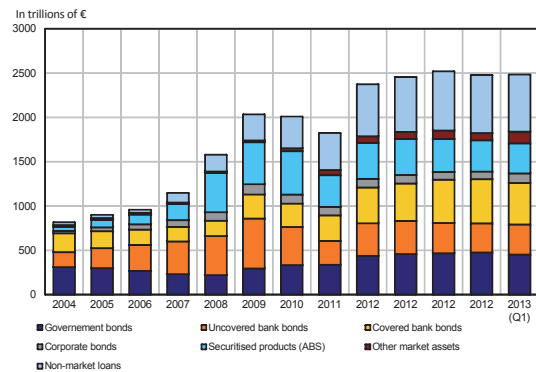
Since 2008 and the start of the financial crisis, all of the central banks intervened on a massive scale to ease the tension on the financial markets and support the economic recovery. One of the consequences of this intervention was to maintain the supply of risk-free assets.

The injection of liquidity into the financial system by the central banks in exchange for a very wide range of collateral also helped to underpin the supply of safe assets.<sup>a</sup> These injections of liquidity coupled with a change in central banks' collateral policy made it possible to inject safe assets into the financial system in the form of central bank reserves (the most liquid and safest form of assets) in exchange for securities that were not very liquid or not liquid at all, particularly those securities that had lost their risk-free status during the crisis.<sup>b</sup>

In the euro area in particular, the composition of the collateral accepted by the ECB during its repo operations has changed considerably since the crisis began (Chart 5). Securitised products or bank loans (bank loans to the non-financial sector) which were almost inexistent in terms of the collateral accepted by the ECB pre-crisis are two types of assets that have seen the biggest increase post-crisis. The ECB has therefore helped to significantly counterbalance the increased scarcity of risk-free assets in the euro area by injecting central bank reserves into the system in return for assets not deemed safe by the markets.

Unconventional quantitative easing policies targeted at buying back government securities had a neutral impact on the supply and demand of safe assets, since safe assets (government securities) were bought while liquidity was simultaneously injected into the financial system (by creating money).

Chart 5: change in collateral accepted by ECB



Source: ECB.

In a speech given on 1 October 2012, Benoît Cœuré, a member of the ECB Executive Board, said that the ECB would be prepared to continue guaranteeing the supply of safe assets and that it was even ready to permanently extend the range of eligible collateral accepted by the bank in response to the structural changes being experienced by the finance markets (changing regulations, increase in secured financial transactions).

- a. A second type of central bank intervention that helped to stabilise the supply of safe assets was the purchase of certain assets located, as a result of the severe increase in risk aversion, on the cusp of the safe asset universe and the risky asset universe. By momentarily shoring up the price of these assets, central banks helped to keep these markets liquid and avoid these assets losing their risk-free status. In the euro area, these interventions took place mainly on the covered bond markets while the US Fed provided direct support to the MBS market.
- b. Chailloux, Gray and McCaughrin, (2008), "Central Bank Collateral Frameworks: Principles and Policies", IMF.

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